IN THE SPECIFICATION

Please replace the paragraph beginning on page 1, line 10 with the following new paragraph:

--The miniaturization of electronic microcircuits has focused attention on packaging these devices in a more efficient and reliable manner. A typical electronic microcircuit includes a microelectronic die (i.e., a silicon chip) mounted to a carrier substrate with an epoxy-based material disposed between the die and the substrate. A heat spreader (e.g., aluminum ~~AL~~ Al or copper ~~CU~~ Cu) is typically included in the package and has direct contact with the die so that heat generated by the die can dissipate by convection directly into the surrounding air.--

Please replace the paragraph beginning on page 7, line 11 with the following new paragraph:

--Referring now to Figure 1, there is shown a schematic illustration of a first step of a packaging process wherein a microelectronic die is aligned with a package substrate including a through-hole and a vent hole ~~100~~ in accordance with an embodiment 100 of the present invention. The die 110 may be aligned with the substrate 120 and connected to the substrate 120 using an array of minute solder balls 130 comprised of generally lead or tin solder. The die 110 is mounted to the substrate 120 using a mounting technology called flip chip or C4 attachment ("Controlled Collapse Chip Connection"). A flip chip is a microelectronic die that has a pattern or array of terminations or bond pads, generally metal or metal alloy pads, spaced on an active surface of the flip chip. The array of minute solder balls is disposed on the flip chip bond pads. The flip chip is then positioned (i.e., flipped) such that the solder balls are aligned with an array of bond pads on an active surface of a carrier substrate. The carrier substrate bond pads are

essentially in mirror-image placement to the flip chip bond pads. Of course, it should be noted that the solder balls may be formed on the carrier substrate bond pads, rather than the flip chip bond pads. The solder balls are then heated thereby reflowing them, such that when cooled the solder balls solidify to form conductive pillars between the flip chip bond pads and the carrier substrate bond pads. It should be noted that in the embodiment illustrated by Figure 1, various other types of electrical connections between the die 110 and the substrate 120 may also be used. For instance, the die 110 may be mounted to the substrate 120 using Chip-on-Flex ("COF") packaging where a flex component (i.e., the carrier substrate) is attached with an adhesive layer to an active surface of a microelectronic die.--

Please replace the paragraph beginning on page 8, line 21 with the following new paragraph:

--In the embodiment illustrated by Figure 1, the substrate 120 may be fabricated of laminates such as FR-4, fiberglass or bismaleimide-triazine (BT) material, of coated aluminum, or of alumina, ceramic, or other suitable material and includes multiple dielectric layers and multiple conductive layers (not shown in this view) which are laminated or co-fired between the varied dielectric layers. Conductors on the substrate 120 may be formed of metals, such as copper, aluminum, gold or silver, or by conductive inks formed by known technologies such as by thin-film or thick-film deposition. A through-hole 122 may extend from a first exterior surface of the substrate 120 through to a second exterior surface of the substrate 120 to enable the flow of an underfill encapsulation material (not shown in this view) between the die 110, the substrate 120, and a heat spreader (not shown in this view) as will subsequently be described in greater detail. A vent hole 124 may extend from a first exterior surface of the substrate 120 through to a second exterior surface of the substrate 120 to allow air to escape from between the

die 110, the substrate 120, and the heat spreader as the underfill encapsulation material is dispensed through the through-hole 122. The through-hole 122 and the vent hole 124 may be formed through a drilling operation in an organic substrate and by punching in a ceramic substrate in a manner well known to those skilled in the art of substrate manufacturing. (See also Figure 5 illustrating an embodiment 500, wherein a microelectronic die is aligned with a package substrate ~~500~~ (absent the through-hole 122 and the vent-hole 124) according to an embodiment of the present invention. In the embodiment illustrated by Figure 5, the underfill encapsulation material is fed through a through-hole and a vent hole in a heat spreader (not shown in this view) affixed to the die 110 as will be described in more detail herein).--

Please replace the paragraph beginning on page 10, line 3 with the following new paragraph:

--Referring now to Figure 2, there is shown a heat spreader attached to the backside of a die using a heat-conductive adhesive ~~200~~ in accordance with an embodiment 200 of the present invention. In the embodiment illustrated by Figure 2, the heat spreader 210 is comprised of a material that has a CTE relatively close to that of the die 220 which is attached to the substrate 230 with solder balls 240. In order to minimize the stress between the die 220 and the heat spreader 210 for a silicon die, a heat spreader such as silicon carbide or silicon aluminum carbide is used. Of course, other thermally conductive materials such as copper, aluminum, titanium, and the like may also be used. The heat spreader 210 is attached to the back of the die 220 using heat conducting adhesive 225 (e.g., grease, phase changing material, or solder) to absorb any thickness variation and to provide the least thermal resistance. Portions of the heat spreader 210 in the form of pillars 212 and 214 surround the die 220, forming a rectangular or square shaped barrier around the die 220 and effectively shifting the CTE stress area to the heat spreader 210

rather than to the die 220. It should be noted that although rectangular shaped pillars 212 and 214 are used in the embodiment illustrated by Figure 2 (thus matching the rectangular shape of the die 220), it is not necessary to use pillars 212 and 214 that are the same shape of the die 220. Moreover, although the dimensions of the pillars 212 and 214 in the present embodiment are approximately 1 mm. each, these dimensions are flexible.--

Please replace the paragraph beginning on page 15, line 16 with the following new paragraph:

-- In an alternative embodiment (*See* Figure 6 illustrating an embodiment 600, wherein a heat spreader including a through-hole and a vent hole is attached to the backside of a die using heat conductive adhesive ~~600~~) a through-hole 216 and a vent hole 218 extend from a first exterior surface of the heat spreader 210 through to a second exterior surface of the heat spreader 210 (rather than the through-hole 232 and the vent hole 234 extending through the substrate 230) to enable the flow of an underfill encapsulation material (not shown in this view) between the die 220, the substrate 230, and the heat spreader 210 and to allow air to escape from between the die 220, the substrate 230, and the heat spreader 210 as the underfill encapsulation material is dispensed.--

Please replace the paragraph beginning on page 12, line 8 with the following new paragraph:

-- Referring now to Figure 3, there is shown a schematic illustration of a third step of a packaging process wherein an epoxy-based material is injected via a through-hole into a gap between a die, a substrate, and a heat spreader ~~300~~ in accordance with an embodiment 300 of the present invention. Typically, a dispense process or a transfer molding process is used to insert

the underfill encapsulation material 340 around the die 330 (which is attached to the substrate 310 with solder balls 350) through a through-hole 312 in the substrate 310. In the embodiment of the invention illustrated by Figure 3, an epoxy-based resin mixture having at least two epoxy groups in a molecule and a curing agent thereof may be used for the underfill encapsulation material 340. It should be noted, however, that any of the commercially available materials sold for underfill applications may be used in conjunction with the present invention. Likewise, any type of commercially available dispensing equipment may be used in practicing the invention.--

Please replace the paragraph beginning on page 13, line 12 with the following new paragraph:

-- In an alternative embodiment (*See* Figure 7 illustrating an embodiment 700, wherein an epoxy-based material is fed through a through-hole in a heat spreader into a gap between a die, a heat spreader, and a substrate ~~700~~) the underfill encapsulation material 340 is fed through a through-hole 322 extending through the heat spreader 320 (rather than through the substrate 310) and fills the gap 360 between the die 340, the substrate 310, and the heat spreader 320. A vent hole 324 extending through the heat spreader 320 (rather than through the substrate 310) allows air to escape from between the die 330, the substrate 310, and the heat spreader 320 as the underfill encapsulation material is dispensed.--

Please replace the paragraph beginning on page 14, line 4 with the following new paragraph:

-- Referring now to Figure 4 there is shown a schematic illustration of a final step of a packaging process wherein a mechanical reinforcement is implemented between a package substrate including a through-hole and a vent hole and a heat spreader ~~400~~ according to an

embodiment 400 of the present invention. Mechanical reinforcements 410 and 420 connect the substrate 450 to the heat spreader 460 and serve to make the packaging system mechanically more robust and also to provide a positive pressure on the heat conducting adhesive 430, which in turn improves the heat conduction from the die 440 to the heat spreader 460. Mechanical reinforcements 410 and 420 are essentially pillars attached to the substrate 450 and the heat spreader 460 using conventional fastening techniques known in the art of microelectronic fabrication. Mechanical reinforcements 410 and 420 may be fabricated from copper, aluminum, titanium, or other types of suitable metals. The through-hole 452 and the vent hole 454 extend through the substrate and, as explained herein, function to allow the underfill encapsulation material to fill the gap 480 between the die 440, the heat spreader 460, and the substrate 450. The die 440 is affixed to the substrate 450 using solder balls 470. (*See also* Figure 8 illustrating an embodiment 800, wherein a mechanical reinforcement is implemented between a package substrate and a heat spreader including a through-hole and a vent hole in a final stage of a packaging process ~~800~~ according to another embodiment. The through-hole 462 and the vent hole 464 extend through the heat spreader 460).--

Please replace the paragraph beginning on page 15, line 3 with the following new paragraph:

--Figure 9 is a schematic illustration of a backside of a microelectronic die ~~900~~ according to an embodiment 900 of the present invention. A die 910 may be aligned with the substrate (not shown in this view) and connected to the substrate using an array of minute solder balls 920 comprised of generally lead or tin solder. Of course, other conductive materials may be used as well.--

Please replace the paragraph beginning on page 15, line 8 with the following new paragraph:

--Thus, a structure and process for reducing die,[[.]] corner and edge stresses in microelectronic packages has been described. Although the foregoing description and accompanying figures discuss and illustrate specific embodiments, it should be appreciated that the present invention is to be measured only in terms of the claims that follow.--